

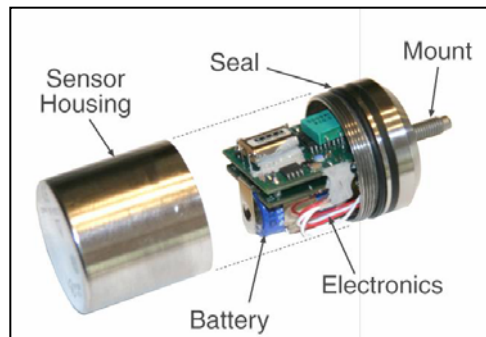


Sensors and Automation

Distributed Wireless Multisensor Technologies – A Novel Approach to Reducing Motor Energy Usage

It is estimated that motors consume 63% of all electricity used in industry. In an effort to reduce plant power consumption, sensors are often used to monitor the efficiency of motors used in industrial applications. Because sensors are able to constantly observe such factors as motor current, vibration, and temperature, degradation of performance and energy efficiency can be quickly detected and the motors repaired. As a result, plants benefit from a reduction in motor energy use.

However, deploying sensors for continuous electric motor monitoring is costly, which means that only critical or large motors (more than 1,000 hp) are currently worth outfitting with the technology. As a result, smaller motors are typically inspected manually and periodically, if at all. This project, headed by GE Global Research, seeks to bring the benefits of continuous monitoring to smaller motors through the development of low-cost, distributed, multi-measurand, wireless sensors. By reducing the cost and complexity of sensor deployment, it is anticipated that continuous monitoring will become pervasive, which will allow



industries to better maintain and improve the efficiency of their electric motor assets.

Key objectives of the effort include creating a reliable, robust wireless communications system and establishing a long-lasting device that can be obtained at a reasonable cost. In addition, researchers will examine issues that could prevent plant managers from adopting sensor technology so that they can develop a low-cost wireless sensor platform that can be easily deployed and adopted by the customer. Project goals will be accomplished through a combination of site measurements and experiments, followed by statistical system performance modeling. Once the system is developed, researchers will assess its performance with on-site field testing.

Applications and Benefits

The establishment of this reliable, robust, and affordable wireless sensor technology is expected to:

- Save an estimated 122 trillion Btus by 2020.
- Allow for continuous motor monitoring.
- Make practical the monitoring of smaller motors that have traditionally been overlooked.
- Allow industries to better maintain and improve the efficiency of their electric motor assets.

Project Participants

- General Electric Global Research (Lead organization)
- Sensicast Systems
- Rensselaer Polytechnic Institute
- Chevron Texaco
- U.S. Department of Energy

Contact

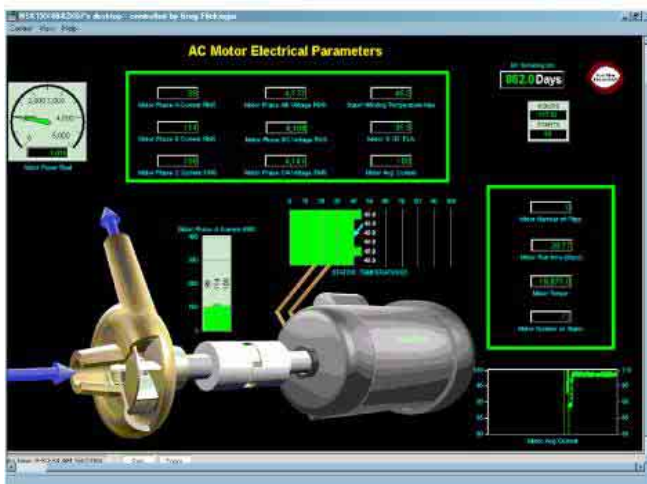
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Project Plans and Progress

Project History: This project was awarded under the Sensors, Controls and Automation Crosscutting Technologies solicitation. The award was signed in the spring of 2004.

The primary goal of this project is to develop an accurate, low cost, and easy to install wireless sensor suite for motor monitoring. This goal will be pursued in three phases, which will focus on proof of concept, laboratory evaluation, and field testing.

- Phase I: Researchers will investigate high-risk aspects of the project, and will develop and refine the technology required to reduce those risks. Specifically, they will examine key multi-measurand sensor technologies, integrated wireless communications and distributed intelligence architecture, and energy management architecture.
- Phase II: The primary components of the system will be developed during this phase. They will be integrated, tested, validated, and demonstrated in a controlled laboratory environment where degraded motor operation and motor faults can be simulated.
- Phase III: During this final phase, the new system will be assembled and demonstrated in an industrial facility. Researchers will record installation and operational experiences, and make any needed changes in the technology.



Sensors and Automation

The Sensors and Automation Activity (S&A), part of the Industrial Technologies Program, develops and deploys integrated measurement systems for operator-independent control of manufacturing processes with broad applicability across multiple industry sectors.

The industry sectors served by S&A are those that have established partnerships with the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy to collaborate in joint technology development for the competitiveness and vitality of the industry.

Work done under S&A will lead in providing the advanced measurement and control technology solutions to meet the needs of all industry sectors supported by the IOF strategy.

To learn more about S&A activities, visit the program web site at:

www.oit.doe.gov/sens_cont/

A Strong Energy Portfolio for a Strong America

Energy Efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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The CPS number for this project is 14226.

